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June 9, 2026

FRAWaivers@dot.gov

Federal Railroad Administration
Associate Administrator for Railroad Safety
Chief Safety Officer
1200 New Jersey Avenue, SE
Washington, DC 20590

Re: Application for Locomotive Control System Test Program under 49 C.F.R. § 211.51

Dear Associate Administrator:

Union Pacific Railroad Company ("UP") hereby submits, pursuant to 49 C.F.R. § 211.51, the enclosed Application for approval of a test program and for the temporary suspension of certain Federal Railroad Administration ("FRA") safety regulations necessary to conduct that program.

As described in the Application, UP seeks approval to conduct a structured, phased test program of a locomotive control system designed to enhance operational safety by integrating existing locomotive control technologies and enabling new operating methodologies. The test program will be conducted in revenue service under controlled conditions and is intended to support verification and validation of system performance, safety, and operational effectiveness.

In accordance with § 211.51, UP demonstrates in the Application that:

- The proposed program qualifies as a test program under § 211.51(a)(1);
- Temporary suspension of specified regulations is necessary to conduct the program;
- The requested relief is limited in scope; and
- The program is conditioned upon adherence to comprehensive safety measures, including a detailed Safety Plan incorporating hazard identification, mitigation controls, and FRA oversight through a joint working group.

UP respectfully requests FRA's approval of the test program and the associated temporary regulatory suspensions to facilitate the safe evaluation of this system. UP intends to continue close coordination with FRA throughout the program, including sharing test data, safety findings, and material system updates.

Please let me know if you have any questions or requests for additional information.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Rod Doerr". The signature is fluid and cursive, with a large initial "R" and a distinct "D".

Rod Doerr
VP & Chief Safety Officer
Union Pacific Railroad Company
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BEFORE THE FEDERAL RAILROAD ADMINISTRATION

**APPLICATION FOR TEMPORARY SUSPENSION OF COMPLIANCE WITH
A SUBSTANTIVE RULE OF THE FEDERAL RAILROAD ADMINISTRATION
FOR THE TESTING OF FREIGHT RAIL TECHNOLOGY**

SUBMITTED BY

Union Pacific Railroad Company

SUBMITTED

June 9, 2026

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1. Introduction

The subject of this application (the “Application”) is a locomotive control system (the “System”). To collect operational data on the System, a Test Program (the “Program”) was developed. The Program is described in detail in Exhibit A.

Safety is an overriding focus of the proposed Program and will be ensured through the Program Safety Plan. This Program Safety Plan outlines safety reviews used to identify potential hazards and implement controls; safety activities and processes that will be used to execute the Program; and the joint Union Pacific (“UP”) and Federal Railroad Administration (“FRA”) working group that will review safety related documents and artifacts throughout the Program. The Program Safety Plan is described in detail in Exhibit B.

FRA approval of this Application will allow for test, demonstration, and validation of the System, building upon extensive testing previously completed in laboratory settings and on-track testing at test facilities. The proposed Program and operational approach will demonstrate and validate substantial improvements to safety. The System enhances safety and reduces exposure to personal injury. For ground-based work events, the System blends new and existing technology to reduce the need for judgment and potential for error in the operation of the locomotive. It enables the operator to direct train movement at the point of the work, reducing risk of misinterpreting radio communication while enhancing safety in red zones when operating between equipment. In addition, the Program will demonstrate the System’s ability to decrease derailments and train separations through consistent and reliable locomotive control, reducing the potential for human error in train handling.

1.1 The System

The System is UP’s initiative for enhanced safety in over-the-road train operations. It is enabled by integration and enhancement of existing locomotive control systems allowing an operator to command train movement throughout a trip. The System enables multiple modes of operation including remote control, providing the ability for an operator to exit the cab and perform ground-based tasks.

The System is a system-of-systems, integrating Energy Management System (EMS) and Remote Control System (RCS); and interacts with stand-alone safety protections such as Positive Train Control (PTC) and locomotive camera-based Point Protection. System functions are managed by an internal executive module that manages modes and interactions between sub-systems. Embedded within the System are layered security features to ensure System authenticity and integrity. PTC is an independent safety overlay,

unchanged by the System. UP has provided detail on the functionality, architecture, and design of the System and underlying technologies through ongoing engagements with FRA.

1.2 Test Program

The Program (see Exhibit A) is designed to demonstrate the effectiveness of the System and evaluate associated operational concepts and approaches related to the new technology. The Program will commence upon approval of Phase 1 and will continue for up to eighteen (18) months from the start. Findings from this Program will be used to inform further improvement of the underlying technologies and collect data to verify and validate the safety of the System and operational approach.

The Program is designed to demonstrate operation in revenue service and validate performance of the System in varied operational environments and modes of operation. A progression of three phases has been defined to evaluate operation of the System on various train types, territories, and operational environments.

Both quantitative and qualitative data will be gathered throughout each phase of the Program to evaluate performance and safety.

2. Request for Approval of the Program

The Program described in this Application and its Exhibits constitutes a test program as defined by 49 Code of Federal Regulations (CFR) § 211.51(a)(1). The Program will be executed through a phased testing approach with defined approval gates requiring FRA concurrence prior to progression. UP respectfully requests the FRA approve the Program because it is necessary for robust verification and validation of System performance and associated safety improvements. This builds upon extensive testing previously completed in laboratory settings and on-track testing at test facilities. The Program will provide validation in varied operational environments, train types and configurations, territories and routes, and physical environments (i.e., day, night, dawn, dusk, rain, snow, and other precipitation). The Program will constitute the first operation of the System in revenue service.

3. Request for Temporary Suspension of Certain Rules

3.1 Standard for Temporary Suspension

Pursuant to 49 CFR § 211.51(a), temporary suspension of FRA regulations is permitted if the temporary suspension is necessary to conduct an FRA-approved test program, the suspension is limited in scope and conditioned on observance of standards

sufficient to ensure safety. In this section, UP summarizes the safety standards that will be in place during the Program; identifies the temporary suspensions necessary for it; and shows that the requested temporary suspensions are of limited scope.

3.1.1 Standards to Assure Safety

Temporary suspension of FRA regulations is permitted if the temporary suspension is conditioned on observance of standards sufficient to assure safety. 49 CFR § 211.51(a)(3). Here, UP has developed and will follow a Safety Plan (see Exhibit B) with defined, structured phases that require FRA concurrence prior to progression. This approach is designed to assure safety of employees, the public, and property based on a hazard analysis, and institution of controls to mitigate hazards.

3.1.2 Requested Temporary Suspensions and Necessity

Per 49 CFR § 211.51(a)(1) and (2), temporary suspension of FRA regulations is permitted if the temporary suspension is necessary to conduct an FRA approved test program of new technology. This section identifies the temporary regulation suspensions necessary to conduct the Program and explains why the suspensions are necessary.

3.1.2.1 49 CFR Part 218 - Railroad Operating Practices, Appendix D - Requirements and Considerations for Implementing Technology Aided Point Protection

Request temporary suspension of:

- 49 CFR Part 218 Appendix D (II)(B)(1): *Before camera-assisted remote control locomotive operations are permitted at highway-rail grade crossings, pedestrian crossings, and yard access crossings, a Crossing Diagnostic Team shall evaluate the crossing.*
- 49 CFR Part 218 Appendix D (II)(B)(2): *Camera-assisted remote control locomotive operations shall only be permitted at crossings equipped with flashing lights, gates, and constant warning time train detection systems where appropriate, based on train speeds.*

This temporary suspension is requested for use of the System in remote control operations for scenarios such as the picking-up and setting-out of cars in work events and the inspection or repair of equipment. Use will occur when the Operator is outside the locomotive cab for limited operations requiring forward movement of equipment at speeds not exceeding 15 miles per hour (mph). Technology aided point protection, via locomotive mounted cameras, streamed to remote displays will be monitored by the Operator to traverse crossings of all types, including crossings not equipped with flashing lights, gates, or warning time train detection systems. The camera placement on the locomotive is

standardized to provide a consistent and repeatable view of the road crossing area that is equivalent to that of an employee sitting inside the cab of a locomotive. In prior engagements with the FRA, UP has demonstrated that this point protection technology and the procedures for its use provide an equivalent level of protection to that of a direct visual determination by a crewmember properly positioned to make the observation.

The technology advancement eliminates the need for fixed cameras to be installed at multiple points around a crossing and provides consistency of view, which removes the need for an evaluation of individual crossings by the Crossing Diagnostics Team outlined in 49 CFR Part 218 Appendix D (II)(B)(1). Along with the safety requirements in 49 CFR § 218.99, this advancement also eliminates the need for the stipulations in 49 CFR Part 218 Appendix D (II)(B)(2) as the Operator retains an equivalent or superior view to in-cab operations that is applicable to all crossing types. A temporary suspension is necessary because the Program will operate on long-distance routes with numerous crossings, making individual evaluations impractical. The technology addresses these considerations, and suspension will facilitate timely and efficient execution of the Program.

The point protection technology is assessed as part of the safety analysis for the System (consistent with the requirements of both 49 CFR Part 229 Subpart E and 49 CFR Part 236 Subpart H). Additionally, the technology contains safeguards to ensure proper operation with multiple indicators of status. Technical protections and functionality to ensure safety include:

1. Visual indicators of stream health and quality are displayed in the point protection video.
2. Automated real-time monitoring of video latency, with blanking of display if latency exceeds a defined threshold.

Consistent with long-standing operating rules, Operators will immediately stop equipment should degradation of the technology or inability to protect the point of movement be encountered. Training will be provided to Operators to emphasize these rules while utilizing the System.

During the Program, a second Operator will provide direct visual determination and warning, when required, at any crossing traversed using the point protection technology as a Program-specific safety measure. This added redundancy is included to ensure safety during the demonstration of the technology.

3.1.2.2 49 CFR § 229.15(b) Remote Control Locomotive – Inspection, Testing, and Repair

Request temporary suspension of 49 CFR § 229.15(b)(1): *Each time an Operator Control Unit (OCU) is linked to a Remote Control Locomotive (RCL), and at the start of each shift, a railroad shall test:*

- (i) The air brakes and the OCU's safety features, including the tilt switch and alerter device; and*
- (ii) The man down/tilt feature automatic notification.*

This temporary suspension is requested for use of the System in remote control operations in crew change events. Section 49 CFR § 229.15(b) requires air brake and OCU safety features be tested each time an OCU is linked to an RCL and at the start of each shift.

As the application of the System is road freight trains, the concept of “shift work” is not applicable. The System will be handed from Operator to Operator, the same as existing road freight train operations. Performance of these tests includes an emergency brake application and subsequent recharge of the air brakes that would require an employee to mount and dismount equipment multiple times to secure a train. Temporary suspension is required because these activities such as mounting and dismounting equipment would introduce unnecessary risk to the employee during the Program.

RCL testing will be completed at initial link of OCU and not repeated while enroute unless the System is unlinked. The frequency of testing required by 49 CFR § 229.15(b) does not anticipate the operational approach associated with using the System.

Safety of operation during this requested suspension is maintained through required testing at OCU linking, automatically enforced by the System to ensure tests are performed prior to allowing movement. Reliability of the OCU device hardware has been proven through millions of hours of use in RCL operations.

Additional technical protection and functionality to ensure safety include:

1. Real-time monitoring of OCU device health, with automated reset and recovery mechanisms if internal software components degrade or become unresponsive.
2. Continual monitoring of OCU communication when utilizing remote control, with automated stopping of equipment if communication not received within a defined threshold.

These technical protections when combined with the proven reliability of the OCU hardware ensure safety during the requested temporary suspension.

3.1.2.3 49 CFR § 229.311(a) Review of Safety Analysis and 49 CFR § 236.913(b) Filing and Approval of Product Safety Plans

Request temporary suspension of:

- 49 CFR § 229.311(a): *Prior to the initial planned use of a product subject to this subpart, a railroad shall inform the Associate Administrator for Safety/Chief Safety Officer, FRA, 1200 New Jersey Avenue SE., Mail Stop 25, Washington, DC 20590 of the intent to place this product in service. The notification shall provide a description of the product, and identify the location where the complete SA documentation described in § 229.307, the testing records contained in § 229.313, and the training and qualification program described in § 229.319 is maintained.*
- 49 CFR § 236.913(b): *Depending on the nature of the proposed product or change, the railroad shall submit either an informational filing or a petition for approval. Submission of a petition for approval is required for PSPs or PSP amendments concerning installation of new or next-generation train control systems. All other actions that result in the creation of a PSP or PSP amendment require an informational filing and are handled according to the procedures outlined in paragraph (c) of this section. Applications for discontinuance and material modification of signal and train control systems remain governed by parts 235 and 211 of this chapter; and petitions subject to this section may be consolidated with any relevant application for administrative handling.*

This temporary suspension is requested because the System integrates and enhances existing locomotive control technologies, including RCS and EMS. To ensure safety during the Program, an extensive development, testing, and safety validation program, which includes full lab integration testing and rigorous field integration and qualification testing at test facilities, will have validated and verified the safety and functional requirements of the System prior to the start of the Program.

Designation of the applicable governing regulation for the System is under review by FRA. A safety analysis consistent with the requirements of both 49 CFR Part 229 Subpart E and 49 CFR Part 236 Subpart H will be prepared prior to start of the Program. However, temporary suspension of the requirement to formally submit the safety analysis to FRA per 49 CFR § 229.311(a) and 49 CFR § 236.913(b) is required so that designation of applicable regulation and associated review path can be determined through observation of the System during the Program.

A multi-disciplinary working group of subject matter experts at UP and FRA representatives will review System safety documents and artifacts before and throughout the Program. Once the applicable regulation is determined, UP will formally submit the System Safety Analysis Report or Product Safety Plan while the Program is executed with the intent for a complete review and/or audit by the FRA before the end of the Program.

3.1.3 Temporary Suspensions Sought Are of Limited Scope

Temporary suspension of FRA regulations is permitted if the temporary suspensions are of limited scope per 49 CFR § 211.51(a)(2). Here, the requested temporary suspensions cover only: two elements of FRA's Operating Practices; two elements of FRA's Locomotive Safety Standards; and one element of FRA's Signal and Train Control Systems Standards, if applicable. UP will continue to comply with all regulations applicable to operations where a suspension or exemption is not requested. Further, temporary suspensions are requested only in direct use of the System during the Program.

4. Conclusion

UP respectfully requests that FRA grant the relief requested herein. The Program described in this Application and its Exhibits is designed to demonstrate a locomotive control system technology and operational approach that provides significant improvements to railroad safety. The requested temporary suspension of FRA regulations is necessary to conduct the Program, is limited in scope, and conditioned on observance of standards sufficient to assure safety.

Exhibit A: Test Program

The Program is designed to demonstrate the effectiveness of the System; collect data to verify and validate the safety of the System; and evaluate associated operational concepts related to the System. The Program will commence upon approval of Phase 1 and will continue for up to eighteen (18) months from the start. Findings from this Program will be used to inform further improvement of the underlying technologies.

This Program will build upon the extensive System development, testing, and safety validation program, which included full lab integration testing and rigorous field integration and qualification testing at test facilities. These activities, completed prior to the start of the Program, will have validated and verified the safety and functional requirements of the System, proving the System's readiness for operation in the phases outlined in this Test Program. The data from the Program will be gathered and used to inform continued enhancement of the technology and relevant operating procedures. Both quantitative and qualitative data will be gathered throughout each phase of the Program to validate System performance and safety.

System software may be updated during execution of the Program. System software updates are controlled under UP's configuration management plan and implemented only after defined development, verification, and validation processes are completed. Prior to release for Program use, software changes will be tested to confirm the changes operate as intended and do not introduce new faults. UP will notify FRA of material System software updates prior to use in revenue service under this Program. Additionally, UP will identify, in writing to FRA, any changes to the System that alter the concept of operations or the system architecture, introduce new safety-critical functionality, remove safety-critical functionality, or modify the target safety levels.

The Program is designed to test and demonstrate operation in revenue service and validate performance of the System for all operating modes in varied operational environments. These varied environments may affect the performance of the System; hence, data will be correlated with the conditions during testing.

To maximize the completeness and accuracy of data gathered, the Program is designed to validate performance across the following environments:

- Yard and main track operations.
- Various train types and configurations.
- Various territories and routes.
- Physical environments - day, night, dawn, dusk, rain, snow, and other precipitation.

This Program will be executed under the framework of the Safety Plan (see Exhibit B) to ensure safety throughout the entire Program. Additionally, to demonstrate the effectiveness and to verify and validate the safety of the System, performance and safety data will be gathered to validate two key criteria: System reliability and System usability.

- **System Reliability:** To validate reliability of the System, the following indicators will be tracked and recorded throughout each test phase:

1. Unusual or unexpected System failures.

A log will be maintained throughout the Program to record unusual or unexpected results from the System recognized during the testing process. The log will be updated to include appropriate documentation for all recorded entries, to ensure appropriate follow-up and corrective actions are taken.

The evaluation of reliability will also include an assessment of System performance in response to System-initiated events such as faults, ensuring the System performs as expected responding in the intended fail-safe manner.

- **System Usability:** To validate usability of the System, the following indicators will be tracked and recorded throughout each test phase:

1. User feedback and commentary on System operation.
2. Observations from technical experts supervising System operation in revenue service.

The evaluation of usability will also include an assessment of the effectiveness of the System training process and operator actions during interactions encountered in revenue service.

A log will be maintained throughout the Program to record user feedback on the operation of the System. This will include a focus on recommended areas for further enhancement of training, System performance, and System safety.

In addition to the data outlined above, three phases have been defined to demonstrate and evaluate operation of the System. Each phase has defined criteria for proceeding to the next phase of the Program, including FRA concurrence prior to progression. A multi-disciplinary team consisting of UP and FRA representatives will review the results of each phase.

Phase One: Unit train operations on a territory to be determined and shared with FRA prior to testing.

1. Operation of the System will be evaluated on empty and loaded unit trains traversing UP's main track. Unit trains consist of cars with the same commodity of goods (e.g., coal, grain, and rock). These consists represent a

uniform train make-up with non-hazardous material cars and a distributed power locomotive configuration.

2. The route represents topography and terrain representative of the majority of UP's overall network.

Entry Criteria: All field integration and qualification testing is complete, and all critical defects discovered during field testing have been corrected and closed. Critical defects are defined as defects that affect core system functionality where no workaround is available or the defect results in an unsafe condition.

Exit Criteria: Unit train operations with the System occur without direct supervision/support from Test Supervisors or System Engineering Leads, and any critical defects discovered during Phase One have been corrected and closed. Demonstrated performance of the System consistent with the results of previously completed field integration and qualification testing, including failsafe response to faults if encountered. Criteria to be further defined as appropriate based on data collected during the phase and shared with the FRA for concurrence prior to initiating Phase Two.

Phase Two: Manifest operations on a territory to be determined and shared with FRA prior to testing.

1. Operation of the System will be evaluated on mixed manifest trains traversing UP's main track. These consists represent variable train make-up with a mix of car types, commodities, and both head-end only and distributed power locomotive configurations.
2. The route represents topography and terrain representative of the majority of UP's overall network.
3. This phase will include operational scenarios including the picking-up and setting-out of cars in work events.

Entry Criteria: Unit train operations with the System occur without direct supervision/support from Test Supervisors or System Engineering Leads, and any critical defects discovered during Phase One have been corrected and closed.

Exit Criteria: Manifest train operations occur without direct supervision/support from Test Supervisors or System Engineering Leads, and any critical defects discovered during Phase Two have been corrected and closed. Demonstrated performance of the System consistent with the results of previously completed field integration and qualification testing as well as Phase One. Criteria to be

further defined as appropriate based on data collected during the phase and shared with the FRA for concurrence prior to initiating Phase Three.

Phase Three: Additional Train Types and Territories on UP Network.

1. Operation of the System will be expanded to additional train types on the UP network. This will include both uniform and variable train make-up with both head-end only and distributed power locomotive configurations.
2. Operation of the System will be expanded to additional territories on the UP network. This will include territories with characteristics traversed in earlier phases of the Program, as well as expansion to territory with new attributes.

Entry Criteria: Manifest train operations occur without direct supervision/support from Test Supervisors or System Engineering Leads, and any critical defects discovered during Phase Two have been corrected and closed.

Exit Criteria: Phase Three operations occur without direct supervision/support from Test Supervisors or System Engineering Leads, and any critical defects discovered during Phase Three have been corrected and closed. Demonstrated performance of the System consistent with the results of previously completed field integration and qualification testing as well as Phases One and Two. Criteria to be further defined as appropriate based on data collected during the phase and shared with the FRA for concurrence upon conclusion.

Performance of Phases Two and Three may occur with trains containing hazardous material cars. For these test phases, the Program will exclude hazardous material “Key Trains.” Key Trains are clearly defined and the identification and exclusion of these trains will be managed throughout the Program. As an additional control to ensure safety, the first 10 trains containing hazardous materials cars will have direct in-cab supervision from an Operations Supervisor trained in operation of the System.

During the Program, performance results, safety data, faults, and System changes will be documented and reviewed by a multi-disciplinary working group consisting of UP and FRA representatives. An FRA test monitor may attend and observe testing throughout the Program. After completion of each phase of the Program, a report will be prepared documenting results and subsequently shared with the FRA.

Exhibit B: Test Program Safety Plan

This Safety Plan defines the safety protocols that will be used throughout the Program.

- Section B.1 summarizes the role of the Test Team for the Program.
- Section B.2 summarizes the safety reviews used to identify potential hazards and implement controls and mitigations for the Program.
- Section B.3 summarizes the safety activities and processes that will be used for the Program.
- Section B.4 summarizes the joint FRA and UP working group that will review safety related documents and artifacts for the Program.

B.1 Program Team Roles

The Test Team is responsible for the successful implementation and fulfillment of the Program Safety Plan and the Program. The Test Team roles are summarized below:

Operations Supervisors will oversee all test activity within their area to ensure compliance with this Safety Plan and all applicable railroad rules. These supervisors will work with the Test Supervisor to schedule test activities to meet the needs of freight customers served by UP, roadway inspection and maintenance, and the Program. These supervisors will be trained in operation of the System and have the authority to stop or pause testing if any safety concern arises. Together with the Test Supervisor, they will jointly oversee the day-to-day operations of the Program. For any emergency event, the Operations Supervisor will have full authority to manage the situation, within the safety protocols established by UP.

Test Supervisor will manage all testing activities in accordance with this Safety Plan, operations and maintenance documentation, configuration management protocols, and test plans developed for each testing phase. This person will be responsible for coordinating test plans, directing the Operators, communicating with dispatchers, and communicating with the System Engineering Team. This person will also work with designated Operations Supervisors to schedule test activities. The Test Supervisor will be trained on the requirements of this Safety Plan and specific characteristics of the System. The Test Supervisor will coordinate with Operations Supervisors to post summaries of activities, achievements, and unusual occurrences to a formal Program test log.

System Engineering Leads will support the Test Supervisor to run the Program and provide System Engineering support. In addition, these individuals will provide System training to Operators and support Operators during Program operations.

Operators will be responsible for utilizing the System in accordance with the operating procedures relevant to the phase of testing and General Code of Operating Rules (GCOR). The Operators will be properly trained and licensed to use the System on the specified revenue service trains. Training specific to the System will include both classroom training and on-train or simulator training. In addition, the Operators will be trained on physical railroad characteristics and UP operating and safety rules.

B.2 Program Safety Reviews - Hazard Analysis, Controls/Mitigations, and Verification

The Test Team will perform safety reviews covering all activities, including activities associated with the requested regulatory suspensions, to be performed in each applicable testing phase. This process will be based on three key steps:

- Identification of reasonably foreseeable conditions (e.g., forecasted extreme weather or an abnormal operating environment) that could cause a hazard, accident, or incident.
- Selection and implementation of new controls (i.e., safety measures and mitigations) to reduce the probability that an identified hazard could occur and/or to mitigate the impacts if the hazard did occur.
- Verification that selected controls have been implemented to mitigate potential risk.

Below are examples of controls that could be deployed in tandem or singly to address identified hazards:

- **Technical Controls** are safety controls that are inherent in how the System works. Examples include on-board diagnostics, redundant components, failsafe component design, configuration management on software/hardware, and analysis/testing processes. Configuration management and testing processes shall adhere to existing and well-established UP practices and procedures.
- **Operational Controls** are safety controls related to daily operations. Examples include inspection and maintenance procedures, protocols for communication with dispatch, operating procedures, and training materials.
- **Administrative Controls** are safety controls associated with the safety processes. Examples include processes that ensure UP is in compliance with all FRA safety regulations not suspended during the Program. Sections B.3 and B.4 describe the proposed Administrative Controls to be applied to the Program.

UP, with technical support from vendors, will have numerous ways to conduct verification of selected controls, including:

- Review of test data, including both on-track tests and laboratory tests of the System.
- Review of the operations and maintenance documentation and other written operating procedures, such as training materials, timetables, system special instructions, and GCOR.
- Review of system design, development, and safety analysis documentation.

B.3 Program Safety Activities and Processes

The Program will include mechanisms to ensure safety during each test phase. This section outlines these protocols.

A written test plan will be developed for each test phase and shared with the FRA for concurrence before testing commences. No testing will be performed without a written test plan. These test plans will include:

1. Entry and exit criteria for each test phase.
2. Configuration of the System while performing the tests, such as which versions of software and hardware will be used for each phase of testing.
3. Documentation of specific procedures to perform the test.
4. Observations and recordings to be made before, during, and after each activity to evaluate the proper functioning of safety features.
5. Documentation of any extreme weather or abnormal operating conditions under which the particular test activities must be suspended because the test cannot be performed safely.
6. Contact information for System Engineers from UP or its vendors who are knowledgeable about the relevant Program and the detailed design of the System, in case of questions.
7. Contact information for Operations Supervisors knowledgeable about the Program, relevant territory, and operating procedures, in case of questions.

Prior to the start of each test plan:

1. A review of all information in the relevant test plan, including a safety briefing.
2. Briefing on any lessons learned from previous testing.
3. Verification that all operating procedures are being observed, including identified controls from safety reviews.
4. Discussion of any safety concerns or identified hazards.

If anyone involved in the test identifies a new hazard that is not already managed by verified controls, testing will be halted until new safety precautions are established and new job briefing has been performed.

Data from test events will be reviewed by the Test Team. The Test Team will transmit any updated test procedures, updated data collection instructions, and/or new safety precautions (i.e., hazards, System faults, and associated mitigations/controls) to the Test Supervisor.

Though not anticipated or foreseen, after the occurrence of any reportable accident or incident, UP will notify the FRA with relevant information.

B.4 Program Safety Review Working Group

A multi-disciplinary working group of subject matter experts at UP and FRA representatives will review before and throughout the Program specific safety data, hazards, controls, faults, changes, and verifications. An active log with this information will be made available to the working group for scheduled reviews.